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Nasya Karmukta with special reference to pharmacodynamics of *Nasya*

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ABSTRACT

Ayurveda has its own unique principles in understanding a disease by its preventive and therapeutic viewpoints. So that *Nasya* "being prime therapy for maintaining the health of *Urdhvajatru*", because the only *Karma*, which finds a place in simple references like "*Dinacharya*" and the most sophisticated places like *Panchakarma*. Nose is highly vascular structure and its mucous membrane provides good absorbing surface. Hence, *Siddha Sneha* on their administration spread along the nasal mucous membrane. An active principle along with *Sneha* gets absorbed inside the olfactory and respiratory mucosa and from there it is carried to different places. *Sneha* provides nourishment to nasal structures and other *Shirogata* organs also. The networks of nasal blood and lymph vessels have many communications with those of sub-Dural and sub arachnoid spaces. This fact is one of the important factors contributing to the extension mentioned drugs from the nose into cranial cavity. Myeline sheath is the first covering of the nerve fibre which is composed of lipid material blood- brain barrier is highly permeable for lipid substances, and substances which are fat soluble. Therefore, these substances can easily passthrough blood brain barrier and exert their action. The lipid contains of p tail may pass through blood-brain barrier easily dure to its transport, some of the active principles may reach up to certain levels in the nervous system to exert their *Vataghna* property.

Key words: *Ayurveda, Panchakarma, Nasya Karma, Tarpana, Sirovirechana Karmukata*

INTRODUCTION

The clear description regarding the mode of action of the *Nasya Karma* is not available in *Ayurvedic* classics. According to *Charaka, Nasa* is the portal (gate way) of *Shirah*[1] The drug administered through nose as *Nasya* reaches to the brain and eliminates only the morbid *Doshas* responsible for producing the disease. In *Ashtanga Samgraha* it is explained that *Nasa* being the door way to *Shira* (heard), the drug administered through nostrils, reaches *Shringataka* (a *Sira Marma* by *Nasa Srota* and spreads in the *Murdha* (Brain) taking route of *Netra* (eye), *Shrotra* (ear), *Kantha* (throat), *Siramukhas* (opening of the vessels) etc. and scratches the morbid *Doshas* in supra clavicular region and extracts them from the *Uttamanga*[2] *Sushruta* has clarified *Shringataka Marma* as a *Sira Marma* formed by the union of *Siras* (blood vessels) supplying to nose, ear, eye and tongue. It has been further pointed out the injury to this *Marma* may be fatal immediately.[3]

Commentator *Indu* of *Ashtanga Samgraha* opined *Shringataka* as the inner side of middle part of the head i.e., *Shiraso Antarmadhyam*. Under the complications of *Nasya Karma Sushruta* noted that the excessive eliminative ermine may cause *Mastulunga* (cerebral spinal fluid) to flow out to the nose.[4] According to all *Acharyas Nasa* is said to be the portal of *Shira*. It does not mean that any anatomical channel connects directly to the brain but it might be connected pharmacodynamically through blood vessels or through nervous system (olfactory nerve etc.). It is an experimentally proved fact that where any type of irritation takes place in any part of the body, the local

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blood circulation is always increased. This is the result of natural protection function of the body. Something happens when provocation of *Doshas* takes place in *Shirah* due to irritating effect of administered drug resulting an increase of the blood circulation of brain. So extra accumulated morbid *Doshas* are expelled out from small blood vessels and ultimately these morbid *Doshas* are thrown out by the nasal discharge, tears and by salivation. The anatomical point of view there is no such direct pharmacodynamic considerations between nose and cranial organs. Moreover, blood brain barrier is a strict security system that human brain has. The nose is used as a route of drug administration for inhalation of anaesthetic materials and certain decongestants for paranasal sinusitis. Anterior pituitary hormone nasal spray is in practice with modern medical system. Nasal administrations of luteinising hormone (Fink G. et al 1973) and calcitonin (Pontrioli E.A. et al 1983) are found to be equally effective as intravenous infusions in maintaining blood concentrations. Michael Russel (1977) has observed that perspired scent that has been painted on the upper lips has caused the synchronization of the menstrual cycle in female volunteers by contact smelling. An LRH agonist nasal administration for 3-6 months was observed effective in inhibiting ovulation as a contraceptive measure (Berauist et al 1979). The drugs are mostly believed in these cases to be absorbed through nasal and pharyngeal mucosa. Anand (1979) has also attempted contraceptive opined that the route is beneficial than systemic administration. It was claimed that the concentration of drug in C.S.F was very high to that when administered intravenously. An experimental study on the inhibiting effect of Jasmine flowers on lactation was also carried out by fragrance inhalation method proving beneficial on rats (Abraham 1979). Reduction in gland activity and reduction in serum prolactin was also noted. Hypoglycaemic effects of insulin and hyperglycaemic effects of 129 glucagon's hormone are confirmed by intranasal administration in normal and in diabetic patients (Pontrioli E.A. *et al*. 1983). Intranasal gonadotropin hormone releasing hormone has been therapeutically recommended in stimulating luteinising hormone secretion in cryptorchid boys. i.e., having undescended testis (Raifer J. *et al*. 1985). Scientist of the institute of medical sciences Delhi have proved after experiments that the drug administered through nose shows effective action on the brain, so it can be said that there is very close relation between *Shirah* and *Nasa* (nose). Thus, to understand the pathways of *Nasya* drug (classical errhine) acting on the central nervous system, it is important to go in details of the modus operandi of *Nasyakarma*. On the basis of fractional stages of the *Nasyakarma* procedures, we can draw certain rational issue that are as follows:

According to *Susruta*

Nasa Karna Srotro Akshi Jivha Tarpanenam Siranam Sannipatha Sringataka II [Su.Chi.40/30]

A physician proficient in the *Ayurveda* scriptures should employ *Nasya Karma* (errhines) in diseases of the head as the nose being the gateway of head, the medicines administered thereby pervades into the head and cures diseases pertaining to the head.

In *Ayurveda*, the word *Nasya* has been taken specifically to mention the root of administration of the drug. As stated by *Sushruta*, medicines or medicated oils administrated through the nose are known as *Nasya.*

Indhu - comments that *Shiraso Antarmadya* (middle cranial fossa)

Shrungataka Marma - also corelated to cavernous sinus.

Considers *Shringataka Marma* as *Sira* and *Sadyopranahara Marma* and as a composite structure consisting of four *Siras* in connection with four sense organs-viz: nose, ear, eye and tongue.

Acc. to *Acharya Charaka*;

Tadda Uttamangam Anupravishya Munjadishikam Mivasaktam Kevalam Vikarakam Dosham Apakarshati (Ch Si 2/22)

Sneha Pradhana Dravya get absorbed in *Sringatak* region

Munja - which is like type of grass which acts like *Ishika* (i.e., like a painter's brush). This "painter's brush" when

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instilled in the paint, absorbs the paint; in the same way the *Munja* structure attracts the *Doshas* when stimulated by the particular drug.

Munja = Olfactory nerves

While explaining indications of *Nasya,* says *Nasya Karma* in *Griva, Skanda* and *Amsa Rogas* and emphasizes that the *Nasya* will act by absorption via *Shringataka Marma*. Once the absorption takes place the dosha situated in *Shiras* are expelled out just similar to like how the seenk (fibres) are removed from *Munja* (a type of grass with fibres in it) without affecting either of the both i.e., *'Munjadi Shikamiva'*.

One is based on the pharmacological actions viz. *Rechana, Tarpana* etc. Other is based on preparation of drug and the method of its application.

Nasa is the gateway of *Shira,* the drug given by nostrils reaches *Shringata,* spreads in the *Murdha, Netra, Shrotra, Kantha, Shiramukhas*, it scratches the morbid doshas in supraclavicular region and expels them from *Uttamanga.*[5]

Sushruta has clarified *Shringataka Marma* as *Sira Marma* formed by the union of *Siras* (blood vessels) supplying to nose, ear, eye and tongue. He further points out that injury to this *Marma* will be immediately fatal. Under the complications of *Nasya Karma Sushruta* noted that excessive eliminative errhine may cause *Mastulunga* (CSF) to flow out of the nose.[6]

All the *Acharyas* said that *Nasa* is the gateway of *Shira*, it does not mean that it is connected directly to the brain but it might be connected through blood vessels or through nervous system. It is an experimentally proved that -

1. Whenever any irritation take place in any part of body the local blood circulation is always increased.
2. So when provocation of *Doshas* takes place in *Shira* due to irritating effect of administered drug, resulting into increase of blood vessels and these morbid doshas are thrawn out as nasal discharge, tear and salivation.

Mode of Action - Modern point of View[7]

1. Here is no direct pharmacodynamic consideration between nose and cranial organs.
2. The nose is used as a route of administration for inhalation of anaesthetic materials.
3. Paranasal sinusitis, certain agents used as decongestants.
4. Nasal spray is in practice with modern medical system for anterior pituitary hormones.
5. Vassopression or Antidiuretic hormone is already in the market in the form of nasal therapy.
6. Nasal administration of luteinising hormone (Fink Gretal 1973) and calcitonin are found to be equally effective as I.V. infusion.
7. Hypoglycaemic effects of insulin and hyperglycaemic effects of glucagon's hormone are confirmed by intra nasal administration in normal and in diabetic patients. (Patiroli E.A.et al 1983)
8. Intranasal gonadotropin hormone releasing hormone has been the therapeutically recommended in stimulating latinizing hormone secretion in cryptorchid boys (undescended testis) (Reefer j. et al 1985).
9. An LRH agonist nasal administration for 3-6 months was observed effective in inhibiting ovulation as a contraceptive measure (Bergquist et al 1979) the drugs are mostly believed in these cases to be absorbed through nasal and pharyngeal mucosa.

Thus, to understand the pathways of *Nasya* drugs acting on the central nervous system, it is essential to go in details of the modus operandi of *Nasya Karma*.[8,9]

On the basis of stages of *Nasya Karma*, we can draw some certain conclusions as follows -

Effect on neuro-vascular Junction[10]

- The lowering of head.
- Elevation of lower extremities.
- Fomentation of face.

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1. All above procedure have effect on blood circulation to the head as the efferent vasodilator nerves are spread out on the superficial surface of the face, by fomentation may increase blood flow to the brain i.e., momentary hyperaemia.
2. It is also possible that the fall of arterial pressure due to vasodilation may encounter with Cushing's reaction.
3. In which ratio between the CSF pressure and cerebral arterial pressure has reduced, the increased CSF pressure tends to compress the arteries in the brain causing a transient ischemia in the brain.
4. Due to this aroused 'ischemic response' there will be subsequently raise the arterial pressure.
5. This act convinces more of 'slush' created in intracranial space, probably forcing more transfusion of fluids into the brain tissue.

On this ground, it can be said that *Nasya Karma* has definite impact on central neurovascular system and may be lower the blood brain barrier to enable certain drug absorption in the brain tissues.

Effect on Neuro - Endocrine Level:[10]

1. The peripheral olfactory nerves are chemoreceptors in nature.
2. The olfactory nerves differs from other cranial nerves, in its nature of phylogenetically closely related to brain.
3. There are adjacent nerves called terminal nerves which run along the olfactory nerves, it is known that these nerves are connected with limbic system of the brain including hypothalamus.
4. This limbic system and hypothalamus are having control over endocrine secretions.
5. Moreover, hypothalamus is considered to be responsible for integrating the functions of the endocrine system and the nervous system.
6. It is known to have direct nervous connections with the posterior lobe of pituitary.
7. In addition, hypothalamus is indirectly having connections with anterior lobe of pituitary, through portal vessels which supplies blood to the gland.
8. It is believed that the products of such hypothermic stimulation are drained by the portal vessels into the anterior to be the experimental stimulation of olfactory nerves, cause stimulation in certain cells of hypothalamus and amygdaloid complex.
9. Olfaction of certain chemical pheromones is also observed to have impact on menstrual cycle (Russek 1977)

From above points we can grasp the humour behind the recommendation of *Nasya* by *Ayurvedic* scholars in *Punsavana* for changing the sex of the foetus it may be acting through this olfacto - Hypothalamo - Pituttary pathway [9]

Effect on Neuro - Psychological levels:

1. The terminal nerves which run along the olfactory nerve are connected with limbic system of brain.
2. The limbic system is also concerned with behavioural aspect of human being.
3. Thus, certain drugs administered through nose may have an impact on immediate psychological functions by acting on limbic system.

These things support the recommendation of *Nasya* made by Ayurvedic scholars for mental disorders like *Apasmara* and *Unmada*.

Effects on Drugs Absorption and Transportation:

1. Keeping the head in lowered position and retention of medicine in nasopharynx help in providing sufficient time for local drug absorption.
2. On other hand, massage and local fomentation also enhances the drug absorption.
3. The course of drug transversion can occur in two ways -

a) By systemic circulation.

b) By direct pooling into the intracranial region

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The second way is more of interest in our present study. This direct transportation can be assumed again in two paths, viz

a) By vascular path.

b) Lymphatic path.

a) By Vascular Path:

1. Vascular path transportation is possible through the pooling of nasal venial blood to the facial vein, which is naturally occurs.
2. The inferior ophthalmic veins also pool into the facial vein.
3. Both facial and ophthalmic veins have no valves in between.
4. So that, blood may drain on either side, that is to say the blood from facial vein can enter cavernous venous sinus of the brain in reverse direction.
5. Thus, pooling of blood from nasal veins to venous sinuses of the brain is more likely in the head low position due to gravity.
6. Thus, from above points we can say that the absorption of drug material into meninges and related parts of intracranial organs takes place.
7. Also in modern science, it is noted that the infective thrombosis of the facial vein may lead to infection of the meninges.
8. Pooling of the blood from the paranasal sinuses also takes place in same manner.
9. *Vagbhat's* notation of *Shrighataka Srotas* can relate with the above explanation.

b) Lymphatic Path:

Drug transportation by lymphatic path, can reach direct into the C.S.F. It is known that the arachnoid matter is extended to the submucosal area of the nose along with olfactory nerve.

DISCUSSION

Experiments have shown that the dye injected to arachnoid matter has caused colouration of nasal mucosa within seconds and vice versa (Hamilton 1971)

Here, it may worthy to recall *Sushruta's* caution that the excessive administration of *Virechana Nasya* may cause oozing of *Mastulunga* (C.S.F.) into the nose. On the basis, we may say that ancient scholars of ayurveda were aware of the lymphatic path in direct absorption into the brain from nose.

Importance of post *Nasya* massage -

In Ayurvedic classics recommended light massage on the frontal, temporal, maxillary and mastoid on *Manya* region.[7]

Light massage on this region may help to subside the irritation of somatic construction due to heat stimulation and it also helps in removing slush created in this region.

Regarding *Manya* which does *Marma* exist in neck on either side of the trachea, which likely correspond to the carotid sinuses of the neck. Pressure applied on the baroreceptors may bring the cerebral arterial pressure to normal (Hejmadis 1985)

On the basis of above observations, we can state that, the procedures, postures and conducts explained for *Nasya Karma* are of vital importance in drug *Absorption* and transportation.

Acharya Vagbhatas quotation *"Nassa Hi Shirasodvyadram"* states that nose is easiest and closest opening for conveying the potency of medicines to cranial cavity. The *Nasya Dravya* acts by reaching *'Sringataka Marma'* from where it spreads into various *Strotas* (vessels and nerves) and brings out vitiated *Dosha* from the head.

Entry of drugs into brain can be understood by following 3 concepts:

The absorption can be carried out in 3 media. They are;

1. By general blood circulation after absorption trough mucous membrane.
2. The direct pooling in venous sinus of brain via inferior ophthalmic veins.
3. Absorption directly into cerebrospinal fluid.

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Apart from the small veins entering cavernous sinuses of the brain, a pair of venous branches emerging from alienise will drain into facial vein. The ophthalmic veins on the other hand also drain into cavernous sinuses of the meanings and in addition to this, neither the facial vein nor ophthalmic veins have any valves. Therefore, there are more chances of blood draining from facial vein into the cavernous sinuses in the lowered head position.

The nasal cavity directly opens into frontal, maxillary and sphenoidal air sinuses. Epithelial layer is also continuous throughout the length. The momentary retention of drugs in nasopharynx and suction causes oozing of drug material into air sinuses. These sites have rich blood vessels entering the brain and meninges through the existing foramens in the bones. Therefore, there are better chances of drug transportations in the path.

Conclusion

The *Shringataka Marma* has been explained by recent authors as middle cephalic fossa of the skull consisting para nasal sinuses, meningeal vessels and nerves. One can see the truth narrated by *Vagbhata* here - the drug administered enters into paranasal sinuses. That is *Shringataka* where the ophthalmic veins and the other veins spread out. The sphenoidal sinuses are in close relation with intra cranial structures the mentioning of the *Shringataka* in this context seems to be more reasonable. Keeping view of above said facts it can be concluded that *Nasya* and *Nasya Dravya* absorbed through nasal mucosa reaching brain and acting on important centres controlling different neurological, endocrine, circulatory function and showing systemic effect.

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